

REMARKS

Applicants concurrently file herewith an Excess Claim Fee Payment Letter, and corresponding excess claim fee, for one (1) excess total claim and one (1) excess independent claim.

Claims 1-3, 6-13, 16-22, 25-28, 30-34, 38-46 and 50-88 are all of the claims presently pending in the application. Claims 1, 11, 21, 42, 49 and 63-66 have been amended to more particularly define the invention. Claims 86-88 have been added to provide more varied protection for the claimed invention and to claim additional features of the invention. Claim 8 has been canceled without prejudice or disclaimer.

Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-3, 6-13, 16-22, 25-28, 30-34, 38-46 and 50-85 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Claims 1-3, 6-10, 21, 22, 26-28, 30-34, 38, 40-42, 59, 61, 62, 67, 68, 78, 80 and 81 stand rejected under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 6,252,254 to Soules et al. (hereinafter "Soules"), in view of U.S. Patent No. 5,847,507 to Butterworth et al. (hereinafter "Butterworth"), U.S. Patent No. 5,798,536 to Tsutsui, and U.S. Patent No. 5,877,558 to Nakamura et al. (hereinafter "Nakamura"). Claims 11-13, 16-20, 39, 60 and 79 stand rejected under 35 U.S.C. §103(a) as unpatentable over Soules, Butterworth, Tsutsui, and Nakamura as applied to the claims above, and further in view of U.S. Patent No. 6,153,123 to Hampden-Smith et al. (hereinafter "Hampden-Smith"). Claims 25, 69-71 and 73 stand rejected under 35 U.S.C. §103(a) as unpatentable over

Soules, Butterworth, Tsutsui, and Nakamura as applied to the claims above, and further in view of U.S. Patent No. 6,166,489 to Thompson et al. (hereinafter "Thompson").

Claims 46, 49, 50, 72 and 75 stand rejected under 35 U.S.C. §103(a) as unpatentable over Soules, Butterworth, Tsutsui, and Nakamura as applied to the claims above, and further in view of U.S. Patent No. 6,340,824 to Komoto et al. (hereinafter "Komoto"). Claims 43-45, 63-66 and 82-85 stand rejected under 35 U.S.C. §103(a) as unpatentable over Soules, Butterworth, Tsutsui, and Nakamura as applied to the claims above, and further in view of U.S. Patent No. 5,998,925 to Shimizu et al. (hereinafter "Shimizu"). Claims 51-58, 76 and 77 stand rejected under 35 U.S.C. §103(a) as unpatentable over Soules, Butterworth, Tsutsui, and Nakamura as applied to the claims above, and further in view of U.S. Patent No. 6,335,217 to Chiyo et al. (hereinafter "Chiyo"). Claim 74 stands rejected under 35 U.S.C. §103(a) as unpatentable over Soules, Butterworth, Tsutsui, Thompson and Nakamura as applied to the claims above, and further in view of Komoto.

These rejections are respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

The claimed invention of exemplary claim 1 provides a light-emitting apparatus wherein a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device (see Application at page 8, lines 2-19). This provides a light-emitting apparatus of high luminance and high efficiency (see Application at page 3, lines 9-13).

II. WRITTEN DESCRIPTION REJECTION

Claims 1-3, 6-13, 16-22, 25-28, 30-34, 38-46 and 50-85 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement.

Specifically, the Examiner alleges that there is no original support for the limitation “substantially the entire range of 380 nm to 500 nm”.

Applicants respectfully submit that this limitation has been deleted from the claims, thereby rendering the Examiner’s rejection moot.

Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

III. THE PRIOR ART REFERENCES

A. The Soules Reference

Applicants submit that there are elements of the claimed invention that are not taught or suggested by Soules.

That is, Soules does not teach or suggest “*wherein a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device*”, as recited in independent claim 1, and similarly recited in independent claims 11, 21, 42 and 63-66.

The novel combination of features of the claimed invention is not taught or suggested by Soules. The Examiner attempts to rely on Figure 2 of Soules to support his allegations. The Examiner, however, is clearly incorrect.

That is, nowhere in this figure (nor anywhere else for that matter) does Soules teach or suggest that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device. Indeed, nowhere does Soules even mention that the concentration of the fluorescent material changes, let alone teach or suggest the limitation of the claimed invention.

The Examiner alleges that the lens (16) and contains no fluorescent material and that layer (15) contains a certain amount of fluorescent material, therefore there is a “step-wise” change in the concentration of the fluorescent material. The Examiner, however, is clearly incorrect.

That is, even if the Examiner’s above allegation is correct, Soule’s fails to meet the plain meaning of the claim language. Indeed, the claimed invention clearly recites that a concentration of the fluorescent material changes within the fluorescent material resin. The Examiner’s alleged change in concentration does not occur within the phosphor containing layer of Soules.

Indeed, Soules teaches that a LED (12) is covered with a phosphor-containing layer (15). Soules further teaches that a clear polymer lens (16) is molded over the phosphor-containing layer (15) (see Soules at Figure 2 and column 3, lines 51-55). The phosphor-containing layer (15) is the only layer that contains a fluorescent material. The clear polymer lens (16) is separate from the phosphor-containing layer (15), and does not include a fluorescent material. Soules does not teach or suggest a change in the concentration of the phosphor embedded in the phosphor-containing layer (15).

Therefore, the Examiner's alleged change in concentration does not occur within the fluorescent material resin.

Therefore, Soules does not meet the plain meaning of the claimed invention. Therefore, Soules does not teach or suggest each and every feature of the claimed invention.

B. The Butterworth Reference

Applicants submit that there are elements of the claimed invention that are not taught or suggested by Butterworth.

That is, Butterworth does not teach or suggest "*wherein a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device*", as recited in independent claim 1, and similarly recited in independent claims 11, 21, 42 and 63-66.

The novel combination of features of the claimed invention is not taught or suggested by Butterworth. Indeed, the Examiner does not even allege that Butterworth teaches or suggests that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device. The Examiner merely relies upon Butterworth as teaching that a fluorescent-material-containing resin may be contained in the cup portion of a cup-shaped lead frame with a transparent resin sealing member formed thereabove.

Butterworth merely discloses a white LED 100 that includes a blue emitting gallium nitride (GaN) die 110 mounted on a reflector cup lead frame 120 (col. 1, lines 31-

35). A blob of cerium (Ce) activated yttrium aluminum garnet (YAG) phosphor 130 is placed on top of the LED die 110 (col. 1, lines 36-38).

C. The Tsutsui Reference

Applicants submit that there are elements of the claimed invention that are not taught or suggested by Tsutsui.

That is, Tsutsui does not teach or suggest “*wherein a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device*”, as recited in independent claim 1, and similarly recited in independent claims 11, 21, 42 and 63-66.

The novel combination of features of the claimed invention is not taught or suggested by Tsutsui. Indeed, the Examiner does not even allege that Tsutsui teaches or suggests that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device.

The Examiner merely relies upon Tsutsui as teaching a GaN emitter formed on a sapphire substrate and for teaching that the GaN chip may further possess a light reflection film 11 on the rear side of the sapphire substrate for reflecting light that is directed toward the substrate and back toward the front, upper light emission surface.

D. The Nakamura Reference

The Examiner alleges that Nakamura would have been combined with Soules, Butterworth and Tsutsui to teach the claimed invention of claims 1-3, 6-10, 21, 22, 26-28, 30-34, 38, 40-42, 59, 61, 62, 67, 68, 78, 80 and 81. Applicants submit, however, that

these references, even if combined, would not teach or suggest each and every element of the claimed invention.

That is, neither Soules, Butterworth, Tsutsui nor Nakamura, nor any combination thereof, teaches or suggests “*wherein a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device*”, as recited in independent claim 1, and similarly recited in independent claims 11, 21, 42 and 63-66.

Indeed, as indicated above in sections A-C, Soules, Butterworth and Tsutsui fail to teach or suggest this feature. Furthermore, Applicants respectfully submit that Nakamura fails to make up the deficiencies of Soules, Butterworth and Tsutsui.

The novel combination of features of the claimed invention is not taught or suggested by Nakamura. Indeed, the Examiner merely attempts to rely on the light transmitting electrode (15) of Namkaura as teaching the transparent electrode of the claimed invention.

Nowhere, however, in this passage (nor anywhere else for that matter) does Nakamura teach or suggest that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device. Indeed, the Examiner does not even allege that Nakamura teaches or suggests this feature. In fact, the Examiner merely relies upon Nakamura as teaching a light-transmitting electrode. Therefore, Nakamura does not make up for the deficiencies of Soules, Butterworth and Tsutsui.

Thus, Nakamara does not make up for the deficiencies of Soules, Butterworth and Tsutsui.

Therefore, Applicants submit that these references, even if combined, would not teach or suggest each and every element of the claimed invention. Therefore the Examiner is respectfully requested to withdraw this rejection.

E. The Hampden-Smith Reference

The Examiner alleges that Hampden-Smith would have been combined with Soules, Butterworth, Tsutsui and Nakamura to teach the claimed invention of claims 11-13, 16-20, 39, 60 and 79. Applicants submit, however, that these references, even if combined, would not teach or suggest each and every element of the claimed invention.

That is, neither Soules, Butterworth, Tsutsui, Nakamura nor Hampden-Smith, nor any combination thereof, teaches or suggests “*wherein a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device*”, as recited in independent claim 1, and similarly recited in independent claims 11, 21, 42 and 63-66.

Indeed, as indicated above in sections A-D, Soules, Butterworth, Tsutsui and Nakamura fail to teach or suggest this feature. Furthermore, Applicants respectfully submit that Hampden-Smith fails to make up the deficiencies of Soules, Butterworth, Tsutsui and Nakamura.

The novel combination of features of the claimed invention is not taught or suggested by Hampden-Smith. Indeed, the Examiner merely attempts to rely on Hampden-Smith as allegedly teaching various sulfur-containing phosphors that can be used in an array of applications including photoluminescence. The Examiner relies upon columns 35-37 of Hampden-Smith to support his allegations.

Nowhere, however, in this passage (nor anywhere else for that matter) does Hampden-Smith teach or suggest that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device. Indeed, Hampden-Smith merely teaches using ZnS:Eu, Cu, Au and Al phosphors for various hues of blue/green light and CaS:Eu for red light (see Hampden-Smith at column 36, lines 8-19). The Examiner does not even allege that Hampden-Smith teaches that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device.

Thus, Hampden-Smith fails to make up for the deficiencies of Soules, Butterworth, Tsutsui and Nakamura.

Therefore, Applicants submit that these references, even if combined, would not teach or suggest each and every element of the claimed invention. Therefore the Examiner is respectfully requested to withdraw these rejections.

F. The Thompson Reference

The Examiner alleges that Thompson would have been combined with Soules, Butterworth, Tsutsui and Nakamura to teach the claimed invention of claims 25, 69-71 and 73. Applicants submit, however, that these references, even if combined, would not teach or suggest each and every element of the claimed invention.

That is, neither Soules, Butterworth, Tsutsui, Nakamura nor Thompson, nor any combination thereof, teaches or suggests “*wherein a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said*

GaN semiconductor light-emitting device”, as recited in independent claim 1, and

similarly recited in independent claims 11, 21, 42 and 63-66.

Indeed, as indicated above in sections A-D, Soules, Butterworth, Tsutsui and Nakamura fail to teach or suggest this feature. Furthermore, Applicants respectfully submit that Thompson fails to make up the deficiencies of Soules, Butterworth, Tsutsui and Nakamura.

The novel combination of features of the claimed invention is not taught or suggested by Thompson. Indeed, the Examiner merely attempts to rely on Thompson as allegedly teaching a full-color LED assembly including two LEDs and a photoluminescent downconverter phosphor disposed for re-emission of longer wavelength light in response to light that is emitted from only one of the two LEDs. The Examiner relies upon the disclosure of Thompson to support his allegations.

Nowhere, however, in this passage (nor anywhere else for that matter) does Thompson teach or suggest that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device. Indeed, the Examiner does not even allege that Thompson teaches that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device.

Thus, Thompson fails to make up for the deficiencies of Soules, Butterworth, Tsutsui and Nakamura.

Therefore, Applicants submit that these references, even if combined, would not teach or suggest each and every element of the claimed invention. Therefore the Examiner is respectfully requested to withdraw these rejections.

G. The Komoto Reference

The Examiner alleges that Komoto would have been combined with Soules, Butterworth, Tsutsui and Nakamura to teach the claimed invention of claims 46, 49, 50, 72 and 75. Additionally, the Examiner alleges that Komoto would have been combined with Soules, Butterworth, Tsutsui, Thompson and Nakamura to teach the claimed invention of claim 74. Applicants submit, however, that these references, even if combined, would not teach or suggest each and every element of the claimed invention.

That is, neither Soules, Butterworth, Tsutsui, Nakamura, nor Thompson nor Komoto, nor any combination thereof, teaches or suggests “*wherein a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device*”, as recited in independent claim 1, and similarly recited in independent claims 11, 21, 42 and 63-66.

Indeed, as indicated above in sections A-F, Soules, Butterworth, Tsutsui, Thompson and Nakamura fail to teach or suggest this feature. Furthermore, Applicants respectfully submit that Komoto fails to make up the deficiencies of Soules, Butterworth, Tsutsui, Thompson and Nakamura.

The novel combination of features of the claimed invention is not taught or suggested by Komoto. Indeed, the Examiner merely attempts to rely on Komoto as allegedly teaching a plurality of light emitting devices arranged in a matrix for various types of displays, that the fluorescent material may be dispersed in a layer that is formed on top of a subadjacent light transmittable layer that focuses the light, and that the device may include two light transmission layers respectively including first and second

materials. The Examiner relies upon column 2, lines 25 et seq. and Figures 30C and 41-46 of Komoto to support his allegations.

Nowhere, however, in this passage or these figures (nor anywhere else for that matter) does Komoto teach or suggest that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device. Indeed, the Examiner does not even allege that Komoto teaches that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device.

Thus, Komoto fails to provide the deficiencies of Soules, Butterworth, Tsutsui, Thompson and Nakamura.

Therefore, Applicants submit that these references, even if combined, would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw these rejections.

H. The Shimizu Reference

The Examiner alleges that Shimizu would have been combined with Soules, Butterworth, Tsutsui and Nakamura to teach the claimed invention of claims 43-45, 63-66 and 82-85. Applicants submit, however, that even if these references were combined, the combination would not teach or suggest each and every element of the claimed invention.

That is, neither Soules, Butterworth, Tsutsui, Nakamura nor Shimizu, nor any combination thereof, teaches or suggests “*wherein a concentration of said fluorescent*

material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device", as recited in independent claim 1, and similarly recited in independent claims 11, 21, 42 and 63-66.

Indeed, as indicated above in sections A-D, Soules, Butterworth, Tsutsui, and Nakamura fail to teach or suggest this feature. Furthermore, Applicants respectfully submit that Komoto fails to make up the deficiencies of Soules, Butterworth, Tsutsui, and Nakamura.

The novel combination of features of the claimed invention is not taught or suggested by Shimizu. Indeed, the Examiner merely attempts to rely on Shimizu as allegedly teaching that it was conventionally known to provide LED groups including R, G, B and W LEDs for various conventional light purposes. The Examiner relies upon Figure 12 of Shimizu to support his allegations.

Nowhere, however, in this figure (nor anywhere else for that matter) does Shimizu teach or suggest that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device. Indeed, the Examiner does not even allege that Shimizu teaches that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device.

Thus, Shimizu fails to make up for the deficiencies of Soules, Butterworth, Tsutsui and Nakamura.

Therefore, Applicants submit that these references, even if combined, would not teach or suggest each and every element of the claimed invention. Therefore the Examiner is respectfully requested to withdraw these rejections.

I. The Chiyo Reference

The Examiner alleges that Chiyo would have been combined with Soules, Butterworth, Tsutsui and Nakamura to teach the claimed invention of claims 51-58, 76 and 77. Applicants submit, however, that even if these references were combined, the combination would not teach or suggest each and every element of the claimed invention.

That is, neither Soules, Butterworth, Tsutsui, Nakamura nor Chiyo, nor any combination thereof, teaches or suggests “*wherein a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device*”, as recited in independent claim 1, and similarly recited in independent claims 11, 21, 42 and 63-66.

Indeed, as indicated above in sections A-D, Soules, Butterworth, Tsutsui, and Nakamura fail to teach or suggest this feature. Furthermore, Applicants respectfully submit that Komoto fails to make up the deficiencies of Soules, Butterworth, Tsutsui, and Nakamura.

The novel combination of features of the claimed invention is not taught or suggested by Chiyo. Indeed, the Examiner merely attempts to rely on Chiyo as allegedly teaching that the blue-emitting LED active region may be composed of InGaN MQWs. The Examiner relies upon column 12, lines 57-65 of Chiyo to support his allegations.

Nowhere, however, in this figure (nor anywhere else for that matter) does Chiyo teach or suggest that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device. Indeed, the Examiner does not even allege that Chiyo teaches that a concentration of the fluorescent material changes within the fluorescent material resin, as a function of distance to the GaN semiconductor light-emitting device.

Thus, Chiyo fails to provide the deficiencies of Soules, Butterworth, Tsutsui and Nakamura.

Therefore, Applicants submit that these references, even if combined, would not teach or suggest each and every element of the claimed invention. Therefore the Examiner is respectfully requested to withdraw these rejections.

IV. NEW CLAIMS

New claims 86-88 are added to provide more varied protection for the present invention and to claim additional features of the invention. The claims are independently patentable because of the novel features recited therein.

Applicants respectfully submit that new claims 86-88 are patentable over any combination of the applied references at least for analogous reasons to those set forth above with respect to claims 1-3, 6-13, 16-22, 25-28, 30-34, 38-46 and 50-88.

V. STATEMENT OF SUBSTANCE OF INTERVIEW

As a preliminary matter, Applicants' representative would like to thank the Examiner for courtesies extended in the personal interview conducted on February 8, 2006.

An Examiner's Interview Summary Record (PTOL-413) was provided by the Examiner at the interview on February 8, 2006.

Applicants submit this Statement to comply with the requirements of M.P.E.P. § 713.04.

In the interview, the following was discussed:

A. Identification of claims discussed:

Claims 1 and 8.

B. Identification of prior art discussed:

Soules.

C. Identification of principal proposed amendments:

None.

D. Brief Identification of principal arguments:

Applicants' representative respectfully pointed out that the original disclosure provided support for the limitation "substantially an entire range of 380 nm to 500 nm". Additionally, Applicants' representative pointed out that the cited prior art references did

not teach or suggest that “a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device”, as recited in exemplary dependent claim 8.

E. Results of the Interview:

In response to the arguments presented, the Examiner indicated that the original Specification did not include support for “substantially an entire range of 380 nm to 500 nm”.

Additionally, the Examiner indicated that the cited prior art references did not appear to teach or suggest that “a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device”. However, the Examiner indicated that it may be necessary to further define this feature in the claimed invention.

F. Conclusion:

Applicants respectfully submit that the cited prior art references do not teach or suggest that “a concentration of said fluorescent material changes within said fluorescent material resin, as a function of distance to said GaN semiconductor light-emitting device”.

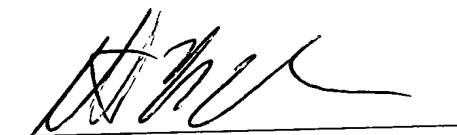
VI. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicants submit that claims 1-3, 6-13, 16-22, 25-28, 30-34, 38-46 and 50-88, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview. The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: February 10, 2006


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